

Docket No. 253.44337X00
Serial No. 10/511,730
Office Action dated March 24, 2006

REMARKS

I. Introduction

By the present Amendment, claims 1 – 15 have been amended. No claims have been added or canceled. Accordingly, claims 1 – 15 remain pending in the application. Claims 1, 6, and 15 are independent.

II. Office Action Summary

In the Office Action of March 24, 2006, the drawings were objected to because of various informalities. The Specification was objected to because of various informalities. Claims 4 and 11 and 10 – 14 were objected to under 37 C.F.R. §1.75(c) as being in improper multiple dependent form. Claims 1 – 15 were rejected under 35 U.S.C. §112, second paragraph. Claims 1 – 15 were rejected under 35 U.S.C. §112, first paragraph. Claims 1 – 3, 6, and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent JP 06-067605 to Yura in view of U.S. Patent 5,333,248 issued to Christensen. Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over Yura in view of Christensen, and further in view of U.S. Patent 5,249,263 issued to Yanker. Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Yura in view of Christensen, and further in view of Yanker, and still further in view of U.S. Patent 5,961,573 issued to Hale. Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Yura in view of Christensen, and further in view of Yanker, and still further in view of Hale, and even further in view of U.S. Patent 5,884,217 issued to Koyanagi. These rejections are respectfully traversed.

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III. Drawing Objections

The drawings were objected to as failing to comply with the requirements of MPEP §608.02(g) and 37 C.F.R. §1.83(p)(5) and 1.83(a). Regarding this objection, the Office Action points to various instances of omissions and informalities.

Concurrently submitted herewith, are replacement drawing sheets that include figures 1 – 4, 6, and 7. Withdrawal of this objection is therefore respectfully requested.

IV. Objections to the Specification

The Specification was objected to for failing to comply with the requirements of MPEP §608.01(b). In particular, the Office Action noted that the Abstract was in improper format and contained various grammatical errors.

Concurrently submitted herewith, is a new Abstract that corrects these errors and complies with the requirements of the MPEP.

V. Rejections Under 35 USC §112

Claims 1 – 15 were rejected under 35 U.S.C. §112, first paragraph, as being based on a non-enabling disclosure. Regarding this rejection, the Office Action indicates that the interpolation between discontinuous portions is critical or essential to practicing the invention, but not included in the claims. The Office Action further notes that the disclosure does not provide detailed explanations necessary for one of ordinary skill in the art to practice the invention. Applicants respectfully disagree.

As to the requirements for sustaining a rejection under 35 U.S.C. §112, first paragraph, Applicants note that the Patent Office bears the burden of presenting objective evidence to support such a rejection. The specification is not intended to be a tutorial. As noted by the Federal Circuit, "A patent is not a scientific treatise, but

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a document that presumes a readership skilled in the field of the invention."
Emphasis added. See *Ajinomoto Co., Inc. v. Archer-Daniels-Midland Co.*, 228 F.3d 1338, 56 USPQ2d 1332, 1338 (Fed. Cir. 2000). Satisfaction of the written description requirement does not require *haec verba* antecedence in the originally filed application. See *Staehelin v. Secher*, 24 USPQ2d 1513, 1519 (B.P.A.I. 1992).

The present specification provides sufficient disclosure to enable a skilled artisan to practice the invention. The Office Action indicates that the details of the interpolation have not been provided in the specification. However, the specification provides various equations and definition of the variables. See pages 19-20 of the specification. It is presumed that a skilled artisan in the field of computational topography is capable of resolving such equations algebraically or computationally. Accordingly, such a skilled artisan would not require a tutorial on performing such calculations. Further, as the court has stated, a skilled artisan is familiar with the literature in the field of the invention. Accordingly, such a person could easily obtain reference material should such a tutorial be necessary.

Applicants respectfully submit that the presently pending claims are properly supported by the disclosure and request withdrawal of this rejection.

Claims 1 – 15 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarding as the invention. Regarding this rejection, the Office Action cites various instances of language that was considered indefinite and otherwise lacking in proper antecedent basis.

By the present Amendment, Applicants have amended the claims in part, to address all issues of indefiniteness raised in the Office Action.

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It is therefore respectfully submitted that, as amended, claims 1 – 15 satisfy the requirements of 35 U.S.C. §112, second paragraph. Withdrawal of this rejection is therefore respectfully requested.

VI. Rejections Under 35 USC §103

Claims 1 – 3, 6, and 15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Yura in view of Christensen. Regarding this rejection, the Office Action alleges that Yura discloses a basic map of the earth that is produced through UTM, where the basic map is divided into grid-like sectors, and where the grid-like sectors are divided into smaller segments. The Office Action further indicates that it is inherent in Yura's system to connect point with the same altitude. The Office Action admits that Yura fails to disclose a smoothing process of the obtained data points. Christensen is relied upon for disclosing a process for smoothing data by forming a triangle into curve contour lines. Applicants respectfully disagree.

As amended, independent claim 1 defines a method for producing a digital topographic map that comprises the steps of:

dividing a basic map, produced through a UTM drawing method, into grid-like sectors at a predetermined distance;

further dividing each sector obtained to thereby produce small sectors;

interpolating discontinuous data between each sector and between each of the small sectors;

producing digital data by using an algorithm to related x,y coordinates of the small sectors to elevation levels obtained through measurement;

connecting the small sectors at a common elevation with a straight line, thereby producing a first topographic map, on which contour lines are formed with line segments; and

conducting a smoothing process on the contour lines of said first topographic map to produce a second topographic map, on which the contour lines are formed with curved lines that are smoother than the contour lines of said first topographic map.

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According to the method of independent claim 1, a basic UTM map is divided into grid-like sectors and subdivided into small sectors. An interpolation is performed on discontinuous data point between each sector and each small sector. Digital data is produced to relate x,y coordinates of the small sectors to elevation levels obtained through measurements. Small sectors at a common elevation are connected with a straight line to produce a first topographic map wherein the contour lines are formed with line segments. A smoothing process is performed on the contour lines to produce a second topographic map wherein the contour lines are formed with curved lines that are smoother than the contour lines of the first topographic map.

The invention defined by independent claim 1 provides various advantages when constructing digital topographical maps. As can be appreciated, when a portion of the earth is reproduced on a two-dimensional surface, discontinuities will occur. Accordingly, when sectors are divided and aligned next to each other, a gap is created and certain data points are lost in the mesh data. According to the present invention, the discontinuous mesh data between sectors is interpolated to generate additional data points so that contour lines can be generated within the gap. Additionally, a smoothing process is performed so that the line segments produced from the interpolation can be presented in the form of smooth contour lines.

Yura appears to disclose a computer system and method for processing maps. The system is capable of selecting from various kinds of conventional drawing methods for the maps based on a request to display the map. Once a request has been received, the system determines the most suitable method for displaying the map. However, Yura does not appear to provide any disclosure or

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suggestion for addressing the discontinuity that results when neighboring sectors are aligned next to each other.

Christensen discloses a method smoothing raw isolines containing linear segments within a triangular mesh which represents a single-valued surface. Christensen does not appear to be concerned with the problems associated with the discontinuity resulting between neighboring sectors. There does not appear to be any disclosure or suggestion for performing any interpolation between adjacent sectors.

The combination of Yura and Chris fails to disclose or suggest all of the features recited in independent claim 1. Both references fail to provide any disclosure or suggestion for performing any interpolation to obtain data points between adjacent sectors. Accordingly, it is not possible for these references to further disclose the feature of smoothing line segments used to connect data points generated by the interpolation. The cited art simply fails to disclose or suggest features recited in independent claim 1 such as:

interpolating discontinuous data between each sector and between each of the small sectors;

producing digital data by using an algorithm to related x,y coordinates of the small sectors to elevation levels obtained through measurement;

connecting the small sectors at a common elevation with a straight line, thereby producing a first topographic map, on which contour lines are formed with line segments; and

conducting a smoothing process on the contour lines of said first topographic map to produce a second topographic map, on which the contour lines are formed with curved lines that are smoother than the contour lines of said first topographic map.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

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Claims 2-5 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

Independent claim 6 defines a method for producing a digital topographical map that comprises the steps of:

- dividing a basic map, produced through a UTM drawing method, into grid-like sectors at a predetermined distance;

- further dividing each sector obtained to thereby produce small sectors ;

- interpolating discontinuous data between each sector and between each of the small sectors;

- producing digital data by using an algorithm to relate x,y coordinates of the small sectors to an elevation level obtained through measurement;

- connecting the small sectors at a common elevation with a straight line, thereby producing a first topographic map, on which contour lines are formed with line segments;

- conducting a smoothing process on the contour lines of said first topographic map to produce a second topographic map, on which the contour lines are formed with curved lines that are smoother than the contour lines of said first topographic map;

- revising and interpolating an irregular quadrilateral, produced from the basic map and the map elements through said UTM drawing method to form a right-angled quadrilateral, thereby producing a third topographic map from said second topographic map;

- storing digital data for producing said third topographic map in a recording means, together with map element data;

- displaying the data on a display means as a single or multi-layer structure, or outputting the data on a paper as a topographic map.

Independent claim 6 recites features that are somewhat similar to those recited in independent claim 1. For example, an interpolation process is performed between each sector and each small sector. A smoothing process is also performed on the line segments connecting the interpolated data point. As previously

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discussed with respect to independent claim 1, these features are not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 7-14 depend from independent claim 6, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 6. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

Independent claim 15 defines an apparatus for producing a digital topographic map. The apparatus comprises:

a means for dividing a basic map, produced through a UTM drawing method, into grid-like sectors at a predetermined distance, and further dividing each sector obtained into small sectors while interpolating discontinuous data between each sector and each of the small sectors, and reading elevation levels from digital data of the digital topographic map, so as to be aligned on a plane to be blocked, thereby producing mesh-like data, and further storing the data as vector data therein;

a means for producing a first topographic map by reading out the vector data for each of the small sectors stored in said storing means, so as to connect each small sector with a straight line while selecting a measurement point in a vicinity thereof when the elevation is the same judging from data defining tolerance on the elevation level, without intersection on those line segments with each other;

a means for producing a second topographic map, by conducting a smoothing process upon curved lines, passing through a contact point of the line segments of said first topographic map, and having continuous differential coefficients, thereby producing the second topographic map, on which the contour lines are made up with a group of curved lines;

a means for producing a third topographic map from said second topographic map, by revising and interpolating an irregular quadrilateral, which is produced upon basis of said basic map produced through the UTM drawing method, and also map elements, into a right-angled quadrilateral;

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a recording means for storing therein said digital data for producing said third topographic map, together with map element data; and

a display means for displaying the digital data stored within said recording means into a single or multi-layer structure.

The apparatus of independent claim 15 defines hardware necessary to perform processes that are somewhat similar to those defined by independent claims 1 and 6. For example, the apparatus of independent claim 15 is capable of performing an interpolation between each sector and each small sector. The apparatus is also capable of performing a smoothing process on the line segments connecting the interpolated data point. As previously discussed with respect to independent claim 1, these features are not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claim 15 is allowable over the art of record.

VII. Conclusion

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

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AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 253.44337X00).

Respectfully submitted,
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Attachment: Drawing Replacement Sheet